TOOLS AND EQUIPMENT

Tools

air hoses
Allan keys
applicators
bits
blocks
brooms
caulking gun
chamois
chisels
clamps
connectors
cut-off tool
cutting torch
drill
files
flange tool
frame flange tool
hack saw
hammers
heat gun
hole punch
magnet
manual applicators
measuring sticks
measuring tape
oxy-fuel cutter
paint shaker
plasma cutter
plastic squeegees
pliers
power polishers
propane torch
punches
putty knife
racks
rags
ratchets
razor blades and holder
sander
screw driver
shovels
soap
sockets
spoons
tin snips
tip cleaner
torque wrench
track style straighteners
trim clip removal tools
utility knife
wire crimping tool
wire cutters
wire stripping tools
wire wheels
wrenches

Equipment

air blow gun
air hose
air purifying respirator (charcoal)
approved container
ARC cutter
ball joint remover
benches
bonding equipment
brazing rod
calculator
catalogues
chemical cleaner
computer
computerized diagnostic equipment

continuity tester
corrosion protection applicator
corrosion protection material
dent puller
disposal containers
duct tape
dust mask
ear protectors
electrical tape
environmentally safe disposal containers
estimate sheet
eye wash station
Fax machine
fire blanket
fire extinguishers
fire hoses
first aid station
gloves
GMAW welder
goggles
grinder
hand sanding equipment
heat drying equipment
hot/cold glass removal tools
latex gloves
light
manufacturers' diagnostic equipment
manufacturers' installation and specifications manuals
manufacturers' maintenance instructions
manufacturers' operating instructions
masking materials
measuring equipment
microfiches
mixing tools
paint application equipment
paint booth
paint identification manuals
paint manufacturer's literature
paint mixing machine
paint scales
paint suits
panel protection covers
piano wire
plastic repair equipment
pneumatic air chisel
positive pressure air fed respirator
power sanding equipment
pressure applicators
primer application equipment
refinish equipment
respirator
rivet gun and rivets
safety eye wear
safety footwear
sand blaster
sandpapers
sealant
seam sealer applicator
service light
shop manuals
soldering tools
solvent resistant gloves
spot welder
spray equipment
spreaders
spring compressor
storage boxes or hangers
strainers
stretchers
surge protector
tack rags
technical bulletins
technical manuals
telephone
test cards
test lamps
ultrasonic equipment
vacuum cleaner
viscosity cups
water hose
welding blankets
welding clamps
welding equipment

GLOSSARY

Terms having a significant meaning for this analysis were operationally defined and are as follows:

conventional frame motor vehicle — a motor vehicle consisting of a rigid, heavy frame to which all mechanical and body components are fastened. The frame must be in proper alignment in order to establish correct functioning and alignment of all attached parts.

detailing — detailing includes all the activities performed in the preparation of a motor vehicle for delivery to the customer. Detailing includes but is not limited to unmasking, installation of trim and accessories, cleaning, polishing, application of corrosion protection and road testing.

electrical system — the electrical system on a motor vehicle is designed to generate, store and distribute electricity. The electrical system turns on, turns off and operates electrical components and instruments. The electrical system consists of a battery, alternator, wiring harness, lights, instruments and diagnostic equipment.

glass — a hard transparent substance that is laminated or tempered and sometimes tinted. Motor vehicle glass can be fixed as in windshields and rear windows or moveable as in side windows. There is also hardware used with fixed glass.

glass hardware — glass hardware consists of moveable and adjustable parts and components that ensure the operation of moveable glass and consists of but is not limited to tracks, glass run channels, plastic guides stops and regulators.

interior trim and upholstery — the interior trim and upholstery components of a motor vehicle are designed to provide the occupant with comfort, safety, information and an aesthetically pleasing environment. Interior components consist of but are not limited to door panels, seats, headliners, trim, instrument panels, carpets, dash pads and consoles.

mechanical	mechanical components and systems of a motor vehicle consist of the moving parts that produce motion or a state of balance. Mechanical components and parts consist of but are not limited to suspension systems (steering and suspension), cooling systems, air conditioning systems, brake systems, the power train and the exhaust system.
outer body panels	outer body panels are that portion of a motor vehicle that are attached to the frame or structural components of the vehicle by welding, bonding or bolts. Outer panels can be made of steel aluminium or composite materials and consist of but are not limited to doors, hoods, quarter panels, trunk lids, fenders and bumper covers.
refinishing	refinishing includes all the activities performed in the preparation of a motor vehicle body surface for the final colour coats. Refinishing provides a smooth, level, surface upon which paint will adhere, by sanding, filling, cleaning and priming the surface prior to the application of a final colour coat.
restraint systems	restraint systems provide safety to motor vehicle occupants by limiting their movement, or otherwise protecting them, when in the vehicle. Restraint systems can be passive or reactive. Passive restraint systems (meaning the driver does not control the operation or activation of the system) would be components, such as padded dash pads, head rests, collapsible steering columns, knee bolster, motorized seat belt and supplemental inflatable restraint systems (air bags). Active systems (the user must do something manually) are mainly the standard type seat belt systems which must be engaged by the individual.
structural components	any primary load-bearing portion of the body structure that affects its over-the-road performance or crash-worthiness.
unibody motor vehicle	a newer generation unitized motor vehicle, with the main difference being that all panels contribute to the overall structural integrity of the motor vehicle. These motor vehicles are lighter in weight, with weight saving attributed to computer-aided design and the use of stronger high-strength steels. Because all mechanical components (most of which are non-adjustable) are fastened directly to the body and because the body is of an impact-absorbing design, greater care must be taken in restoring correct body dimensions if the overall safety of the motor vehicle is to be regained after collision repair.

unitized body vehicle a motor vehicle constructed with the absence of a separate frame member, but achieving strength through many intricate sheet metal design fabrications. All mechanical components (most of which are adjustable) fasten directly to the body of the motor vehicle.

unitized stub-frame motor vehicle a motor vehicle consisting of a unitized body up to and including the cowl area, with a short,"stub-frame" attached to the front section. The stub-frame has similar characteristics to the conventional frame and retains all the front-end mechanical components and front-end sheet metal.

PERCENTAGE RATINGS

BLOCK A **SAFETY**

Task 1 Demonstrates safe working practices and techniques to ensure an injury-free work place.

BLOCK B **WORK PRACTICES AND PROCEDURES**

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	25	8	12	5	8	15	5	14	6	5	NV	10%

Task 2 Communicates with others.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	10	25	12	20	5	21	5	5	13	11	15	NV	13%

Task 3 Prepares repair estimates.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	20	5	8	20	5	25	5	5	13	7	5	NV	11%

Task 4 Follows work practices and procedures.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	10	25	30	20	70	19	35	42	33	15	5	NV	28%

Task 5 Operates tools and equipment.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	40	40	40	20	10	21	35	43	33	57	65	NV	36%

Task 6 Maintains tools and equipment.

	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
%	20	5	10	20	10	14	20	5	8	10	10	NV	12%

BLOCK C FRAME AND STRUCTURAL COMPONENTS

	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
%	25	5	8	15	10	23	30	15	14	33	5	NV	17%

Task 7 Assesses damages.

	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
%	20	20	20	33	10	20	35	10	20	14	10	NV	19%

Task 8 Repairs structural component.

	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
%	40	40	40	33	50	40	35	60	40	49	60	NV	45%

Task 9 Replaces structural component.

	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
%	40	40	40	34	40	40	30	30	40	37	30	NV	36%

BLOCK D OUTER BODY PANELS

	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
%	20	25	30	15	30	18	24	30	18	12	30	NV	23%

Task 10 Assesses damages.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	20	20	15	30	10	25	20	10	10	14	5	NV	16%

Task 11 Repairs panel.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	40	40	30	30	40	42	50	45	35	49	45	NV	41%

Task 12 Replaces panel.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	40	40	55	40	50	33	30	45	55	37	50	NV	43%

BLOCK E GLASS

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	4	3	4	7	5	5	10	3	3	5	5	NV	5%

Task 13 Repairs or replaces movable glass.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	50	50	90	20	40	54	30	30	40	90	90	NV	53%

Task 14 Repairs or replaces fixed glass.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	50	50	10	80	60	46	70	70	60	10	10	NV	47%

BLOCK F **MECHANICAL COMPONENTS**

Nat. Avg. 6%

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
	5	5	10	5	5	9	5	5	10	6	5	NV

Task 15 Diagnoses mechanical problems.

Nat. Avg. 30%

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
	50	20	20	40	20	29	75	20	35	12	10	NV

Task 16 Repairs mechanical system.

Nat. Avg. 23%

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
	25	40	10	20	10	39	15	10	15	57	10	NV

Task 17 Replaces mechanical component.

Nat. Avg. 47%

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
	25	40	70	40	70	32	10	70	50	31	80	NV

BLOCK G **ELECTRICAL SYSTEM**

Nat. Avg. 5%

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
	4	5	4	7	5	6	5	2	6	6	2	NV

Task 18 Diagnoses electrical problems.

Nat. Avg. 34%

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
	60	34	30	40	5	30	65	60	30	12	10	NV

Task 19 Repairs electrical system.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	20	33	25	30	20	40	25	15	25	57	30	NV	29%

Task 20 Replaces electrical component.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	20	33	45	30	75	30	10	25	45	31	60	NV	37%

BLOCK H RESTRAINT SYSTEMS

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	2	2	4	7	5	5	5	1	8	11	3	NV	5%

Task 21 Diagnoses restraint system.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	30	40	40	60	20	45	70	10	40	12	10	NV	34%

Task 22 Replaces restraint system.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	70	60	60	40	80	55	30	90	60	88	90	NV	66%

BLOCK I INTERIOR TRIM AND UPHOLSTERY

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	5	3	8	5	4	2	4	5	6	10	NV	5%

Task 23 Assesses damages.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	20	10	15	20	5	27	10	10	15	12	5	NV	14%

Task 24 Repairs interior component.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	50	45	15	60	10	40	30	20	30	31	5	NV	31%

Task 25 Replaces interior component.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	30	45	70	20	85	33	60	70	55	57	90	NV	55%

BLOCK J REFINISHING

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	25	20	21	15	25	18	2	30	16	12	30	NV	19%

Task 26 Prepares surface.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	50	60	60	50	50	55	80	70	70	85	70	NV	64%

Task 27 Applies paint.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	50	40	40	50	50	45	20	30	30	15	30	NV	36%

BLOCK K DETAILING

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	5	8	9	5	4	2	5	6	3	5	NV	5%

Task 28 Assesses detailing requirements.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	20	40	20	25	10	30	10	10	20	12	10	NV	19%

Task 29 Performs detailing procedure.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	60	40	65	30	70	45	80	80	70	70	80	NV	63%

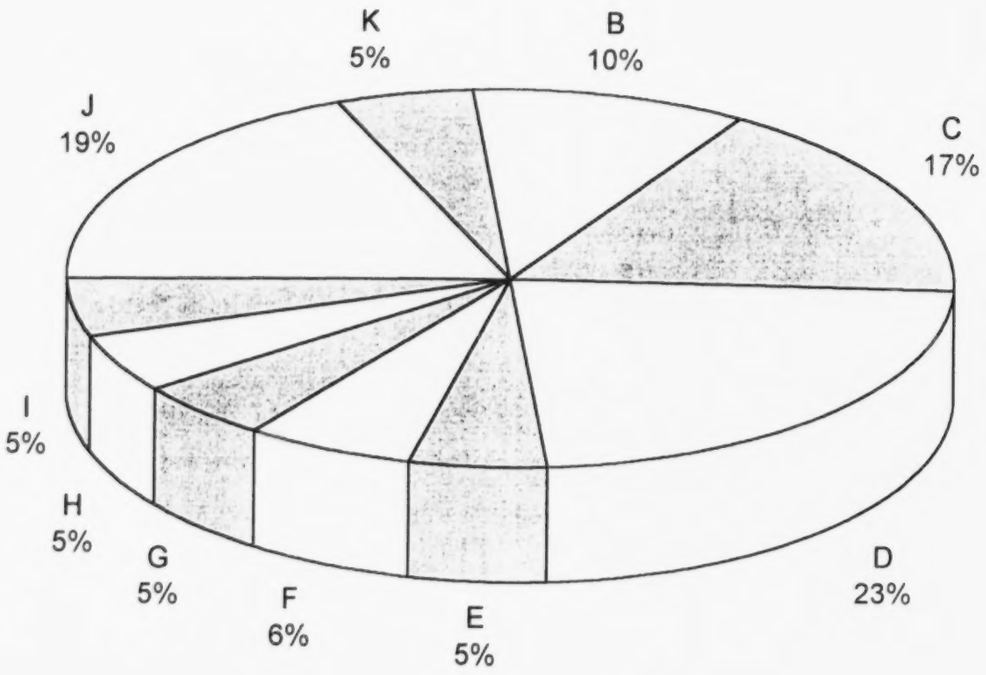
Task 30 Performs final inspection.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	20	20	15	45	20	25	10	10	10	18	10	NV	18%

BLOCK PERCENTAGES

BLOCK PERCENTAGES*

Motor Vehicle Body Repairer
(Metal and Paint)



* The average time a worker spends performing each block in a given year in relation to other blocks of the analysis, taking into consideration the complexity (importance plus difficulty) of the block.

TITLES OF BLOCKS

BLOCK A **SAFETY**••

BLOCK B **WORK PRACTICES AND PROCEDURES**

BLOCK C **FRAME AND STRUCTURAL COMPONENTS**

BLOCK D **OUTER BODY PANELS**

BLOCK E **GLASS**

BLOCK F **MECHANICAL COMPONENTS**

BLOCK G **ELECTRICAL SYSTEM**

BLOCK H **RESTRAINT SYSTEMS**

BLOCK I **INTERIOR TRIM AND UPHOLSTERY**

BLOCK J **REFINISHING**

BLOCK K **DETAILING**

** Since safety practices are a mandatory feature of all occupations, they are considered common core, ratings are not required and thus Block A does not appear on the chart.

MOTOR VEHICLE BODY REPAIRER (METAL AND PAINT) (1997)

	BLOCKS	TASKS	SUB-TASKS
A	**Safety**	**1.** Demonstrates safe working practices and techniques to ensure an injury-free work place.	1.01 Applies first aid. 1.02 Maintains good housekeeping. 1.03 Wears personal protective equipment. 1.04 Operates emergency safety equipment. 1.05 Assures protection from fire hazards. 1.06 Handles hazardous materials. 1.07 Complies with government safety standards and regulations.
B	**Work Practices and Procedures**	**2.** Communicates with others.	2.01 Accesses information. 2.02 Prepares and imparts technical information. 2.03 Applies verbal communication skills. 2.04 Applies written communication skills. 2.05 Uses office equipment.
		3. Prepares repair estimates.	3.01 Obtains necessary customer and vehicle information. 3.02 Performs visual inspection. 3.03 Lists parts, materials and labour required. 3.04 Calculates repair costs.
		4. Follows work practices and procedures.	4.01 Applies organizational skills. 4.02 Interprets the work order. 4.03 Inspects the damage. 4.04 Reconciles parts and materials received to estimate. 4.05 Identifies discrepancies. 4.06 Determines repair procedure. 4.07 Effects repair required. 4.08 Performs pre-delivery inspection.
		5. Operates tools and equipment.	5.01 Operates hand and power tools. 5.02 Operates general shop equipment. 5.03 Operates frame and measuring equipment. 5.04 Operates welding equipment. 5.05 Operates refinishing equipment.
		6. Maintains tools and equipment.	6.01 Maintains hand and power tools. 6.02 Maintains general shop equipment. 6.03 Maintains frame and measuring equipment. 6.04 Maintains welding equipment. 6.05 Maintains refinishing equipment.
C	**Frame and Structural Components**	**7.** Assesses damages.	7.01 Identifies primary and secondary damage. 7.02 Sets up vehicle on frame machine. 7.03 Measures structure to specifications. 7.04 Determines repair and replacement procedures.
		8. Repairs structural component.	8.01 Sets up vehicle for repair equipment. 8.02 Prepares the component for repair. 8.03 Straightens component. 8.04 Verifies specifications. 8.05 Restores integrity. 8.06 Prepares surface for corrosion protection. 8.07 Applies corrosion protection.
		9. Replaces structural component.	9.01 Corrects secondary damage. 9.02 Removes component. 9.03 Prepares damaged area for replacement component. 9.04 Installs replacement component. 9.05 Verifies specifications. 9.06 Prepares surface for corrosion protection. 9.07 Applies corrosion protection.
D	**Outer Body Panels**	**10.** Assesses damages.	10.01 Identifies panel composition. 10.02 Determines repair and replacement procedures.

MOTOR VEHICLE BODY REPAIRER (METAL AND PAINT) (1997)

BLOCKS	TASKS	SUB-TASKS						
	11. Repairs panel.	11.01 Prepares panel for reshaping.	11.02 Reshapes panel.	11.03 Restores panel strength.	11.04 Prepares panel surface for fill.	11.05 Fills panel.	11.06 Sands filler.	11.07 Applies corrosion protection.
	12. Replaces panel.	12.01 Prepares for removal of panel.	12.02 Removes panel.	12.03 Prepares panel for installation.	12.04 Installs panel.	12.05 Applies corrosion protection.		
E **Glass**	**13.** Repairs or replaces movable glass.	13.01 Tests for leaks.	13.02 Repairs leaks.	13.03 Adjusts hardware.	13.04 Removes glass.	13.05 Installs glass.	13.06 Replaces glass.	13.07 Checks for leaks and operation.
	14. Repairs or replaces fixed glass.	14.01 Tests for leaks.	14.02 Repairs leaks.	14.03 Removes glass.	14.04 Installs glass.	14.05 Replaces glass.	14.06 Checks for leaks.	
F **Mechanical Components**	**15.** Diagnoses mechanical problems.	15.01 Inspects mechanical faults visually.	15.02 Tests mechanical systems.	15.03 Determines procedure for repair.				
	16. Repairs mechanical system.	16.01 Sets up repair equipment.	16.02 Removes parts for accessibility.	16.03 Repairs component.	16.04 Verifies system operation and that specifications are met.			
	17. Replaces mechanical component.	17.01 Sets up repair equipment.	17.02 Removes defective component.	17.03 Installs component.	17.04 Verifies component operation and that specifications are met.			
G **Electrical System**	**18.** Diagnoses electrical problems.	18.01 Inspects electrical system visually.	18.02 Tests electrical system.	18.03 Interprets fault codes and flow charts.	18.04 Verifies diagnosis of problem.			
	19. Repairs electrical system.	19.01 Prepares system for repair.	19.02 Repairs system.	19.03 Verifies operation of system.				
	20. Replaces electrical component.	20.01 Prepares system for component replacement.	20.02 Removes defective component.	20.03 Installs component to manufacturer's instructions.	20.04 Verifies operation of component.			

MOTOR VEHICLE BODY REPAIRER (METAL AND PAINT) (1997)

	BLOCKS	TASKS	SUB-TASKS							
H	**Restraint Systems**	**21.** Diagnoses restraint system.	21.01 Inspects restraint system visually.	21.02 Tests restraint system.	21.03 Interprets fault codes and charts.	21.04 Determines replacement procedure.				
		22. Replaces restraint system.	22.01 Prepares component system for replacement.	22.02 Removes defective component.	22.03 Installs component to manufacturer's instructions.	22.04 Verifies operation of system.				
I	**Interior trim and Upholstery**	**23.** Assesses damages.	23.01 Inspects interior components visually.	23.02 Determines repair procedure.						
		24. Repairs interior component.	24.01 Prepares component for repair.	24.02 Repairs component.	24.03 Prepares component for refinishing.	24.04 Refinishes component.				
		25. Replaces interior component.	25.01 Prepares interior component for replacement.	25.02 Removes defective component.	25.03 Refinishes component.	25.04 Installs component.				
J	**Refinishing**	**26.** Prepares surface.	26.01 Inspects repair area visually.	26.02 Determines refinishing procedure.	26.03 Cleans surface.	26.04 Masks adjacent areas.	26.05 Sands surface.	26.06 Mixes primer.	26.07 Applies primer.	26.08 Performs final sanding.
		27. Applies paint.	27.01 Inspects prepared surface visually.	27.02 Determines paint procedure.	27.03 Mixes paint.	27.04 Matches paint.	27.05 Performs final cleaning procedures.	27.06 Applies top coat.		
K	**Detailing**	**28.** Assesses detailing requirements.	28.01 Unmasks vehicle.	28.02 Reviews work order.	28.03 Determines detailing procedure.					
		29. Performs detailing procedure.	29.01 Prepares for detailing.	29.02 Installs trim and accessories.	29.03 Polishes vehicle.	29.04 Cleans vehicle.				
		30. Performs final inspection.	30.01 Inspects vehicle visually.	30.02 Conducts road tests on vehicles.						